

REMARKS

Claim 1 has been amended to recite determining an oxygen uptake rate of the yeast slurry, and increasing an oxygen delivery pressure on the gas side of the membrane and increasing a liquid pressure on the liquid side of the membrane in dependence on the oxygen uptake rate wherein the liquid pressure on the liquid side of the membrane is kept higher than the oxygen delivery pressure on the gas side of the membrane as described at page 6, lines 1-13 and page 7, lines 15-25 of the specification as originally filed. New claim 12 has a basis at page 6, lines 1-13 and page 12, lines 24-29 of the specification as originally filed.

The Office Action rejected claims 1, 2, 4-6 and 10-11 under 35 USC §103(a) as being unpatentable over GB Patent No. 2,197,341 to Quain in view of Masschelein *et al.* (Malting and Brewing Process) and in further view of U.S. Patent No. 4,978,616 to Dean or U.S. Patent No. 4,764,471 to Ripka.

Looking first at amended claim 1, it can be seen that the claimed method now requires increasing an oxygen delivery pressure on the gas side of the membrane and increasing a liquid pressure on the liquid side of the membrane in dependence on the oxygen uptake rate wherein the liquid pressure on the liquid side of the membrane is kept higher than the oxygen delivery pressure on the gas side of the membrane. At page 12, lines 24-29 of the specification, it notes that this method step allows for bubble-free transfer of oxygen to the yeast slurry. This serves to minimize or eliminate foaming as stated at page 12, lines 31-33 of the specification.

Turning now to Quain, there is disclosed a method of aerating yeast prior to fermentation in which the yeast is first diluted with water and then exposed to oxygen for

a period of time until the yeast reaches its maximum rate of oxygen consumption.

Quain does not use a hydrophobic, microporous membrane to transfer oxygen.

With respect to the Masschelein reference, the disclosed process also does not use a hydrophobic, microporous membrane to transfer oxygen.

Referring now to U.S. Patent No. 4,978,616 to Dean, the process of this patent is directed to the oxygenation of the culture liquid without the biocatalyst beads (see column 8, 19-35). Dean does use a membrane oxygenator and discusses an elevated pressure of oxygen. However, Dean does not teach increasing the liquid pressure on the liquid side of the membrane such that the liquid pressure on the liquid side of the membrane is kept higher than the oxygen delivery pressure on the gas side of the membrane as recited in amended claim 1.

Turning to U.S. Patent No. 4,764,471 to Ripka, this patent describes a process in which a culture medium such as molasses is oxygenated in channel 36 and the oxygenated molasses then passes into reaction zone 60 which includes yeast (see column 8, line 53 to column 4, line 8). There is nothing in Ripka that recognizes the foaming problem or that shows or suggests the control of the pressure ratio on the liquid and the gas side of a membrane as recited in amended claim 1 in order to control the foaming problem.

Regarding new claim 12, none of the cited references teaches the measurement of dissolved oxygen in the yeast tank and downstream of the membrane contactor in order to determine the oxygen uptake rate and thereby determine the oxygen delivery pressure to the membrane contactor.

Accordingly, it is believed that all of the elements and limitations of amended independent claim 1 (and claims 2, 4-6 and 10-12 that depend thereon) are not shown or suggested in Quain, Masschelein, Dean or Ripka, taken alone or in combination.

Conclusion

The Applicants respectfully submit that amended independent claim 1 (and claims 2, 4-6 and 10-12 that depend thereon) are in condition for allowance. Favorable reconsideration is respectfully requested.

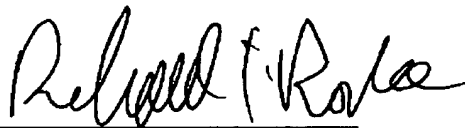
Other than the fee for the three month extension, no additional fees are believed to be needed for this amendment. If additional fees are needed, please charge them to Deposit Account 17-0055.

Respectfully submitted,

Nick J. Huige, *et al.*

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By: _____



Richard T. Roche
Registration No. 38,599
Quarles and Brady LLP
411 East Wisconsin Ave.
Milwaukee, WI 53202
(414) 277-5805

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